

U.S. Serial No. 09/981,928
Amendment mailed March 14, 2005
Response to Office Action dated December 14, 2004

Remarks/Arguments

Applicants have received and carefully reviewed the Office Action of the Examiner mailed December 14, 2004. Claims 1-41 remain pending. Reconsideration and reexamination are respectfully requested.

Information Disclosure Statement

Applicant has not received an initialed copy of the last two pages of the 1449 submitted with the Information Disclosure Statement filed June 6, 2002. Applicants respectfully request that an initialed copy be provided with the next Office Action.

Rejection under 35 U.S.C. § 103

Claims 1-41 are rejected as being unpatentable over Nichani et al. (US 6,469,734) and further in view of Ito et al. (US 6,088,468). The Examiner asserts that Nichani et al. disclose monitoring at least a portion of the border region of the area of interest for breach by an object. The Examiner acknowledges that Nichani et al. fail to teach monitoring at least a portion of the interior region of the area of interest for the object after the object breaches the area. The Examiner asserts that it would have been obvious to incorporate the teaching of Ito et al. for sensing an object within an imaging field into the Nichani et al. system to provide the process of sensing an image object located within visual field of an image device. Applicants respectfully traverse the rejection.

Independent claim 1 recites a method for monitoring an area of interest having a border region and interior region, and includes the steps of:

monitoring at least a portion of the border region of the area of interest for breach by an object; and
monitoring at least a portion of the interior region of the area of interest for the object after the object breaches the border.

Nichani et al. teach an intruder detection method in which a camera is placed to look top-down on a scene. Nichani et al. teach an advantage of their top-down viewing method is that "a single camera-lighting fixture could be used such that the whole area is uniformly lit and viewed. Therefore, the detection capability (sensitivity) is uniform across the

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target area." Emphasis added; see column 6, lines 33-42. Nichani et al. teach viewing the entire target area, not a border region as is recited in the instant claims.

The portion of Nichani et al. on which the Examiner relies (column 5, lines 45-44) discloses using a textured background to create an artificial contrast with respect to intruding objects. Nichani et al. teach using "edge-detection" to detect sudden changes in the texture being viewed. Nichani et al. describe this "edge-detection" in column 5, lines 9-14 as follows:

Segmentation refers to the process of identifying pixels forming a contiguous line segment ("edge") or contiguous area ("blob"), and characterizing such segments according to their location, size and orientation. Further processing of the resulting segments is much faster than processing individual pixel data.

The "edge-detection" described by Nichani et al. is thus a method of rapidly detecting contiguous lines ("edges") in a textured background, and not a method of monitoring a border region as is recited in the instant claims. Nichani et al. thus do not appear to teach the basic element of the claims.

The Examiner asserts that Ito et al. teach monitoring at least a portion of the interior region of the area of interest for an object after the object breaches the border, citing column 11, lines 1-15 for support. This passage of Ito et al. does not appear to contain such a teaching, rather Ito et al. discloses a method in which a background picture is taken about every four seconds and is compared to a new image containing a perceived intruding object. Ito et al. teach that if the similarity between the background and new image is high, the perceived intruding object is actually a shadow. Ito et al. teaches a method similar to that of Nichani et al. in that a background pattern is compared to a current image and an object is detected when the background pattern is altered or obscured. Applicants submit that such methods are distinguished from the instant claim in which a border region is first monitored for an intruding object, and then only if such object is detected in the border region, the interior region is monitored for the object.

The Examiner asserts that Nichani et al. disclose the elements of dependent claims 2-7 and 10. These claims, however, recite various method steps involving when a border region and an interior region of an area of interest are to be monitored. As stated

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above, both Nichani et al. and Ito et al. disclose methods and systems for continuous monitoring of an entire area of interest by comparing a background texture or image to a current image, and detecting when the background has been disrupted or blocked.

Neither reference appears to disclose or suggest separate monitoring of a border region and an interior region, as recited in the claims. The passages from Nichani et al. cited by the Examiner for support appear to describe the capture of the background image of the safety zone, and do not teach or suggest anything related to a border region or interior region.

With regard to claim 8, the Examiner asserts that Nichani et al. disclose the border region comprising a continuous region, pointing to item 103 in Fig. 2 where item L is a continuous region. Nichani et al. actually teach "a target area 103" and a camera system set up to view "a square target area with a side L of 8 meters" (see column 8, lines 11-12 and 17-18). Nichani et al. thus teach a continuous target area that is viewed by the camera, but do not teach or suggest a method for monitoring an area of interest having a continuous border and an interior region, in which at least a portion of the border region of the area of interest is monitored for breach by an object, and then at least a portion of the interior region of the area of interest is monitored for the object after the object breaches the border, as is recited in claim 8.

Regarding claim 9, the Examiner asserts that the claim element of an interrupted border region reads on the change feature of the background in the safety zone or target area taught by Nichani et al. Applicants do not understand this correlation. As stated above, Nichani et al. disclose a single target area and do not teach or suggest separate monitoring of a border region and an interior region. Thus, Nichani et al. cannot be seen to teach an interrupted border region. The background in the safety zone of Nichani et al. is the background pattern in the entire region of interest against which a possible intruding object is compared. Applicants submit that one of ordinary skill in the art would not interpret the background pattern found in the entire target area of Nichani et al. as an interrupted border region as recited in instant claim 9.

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Independent claim 11 recites the method steps of:

capturing an capture image of the area of interest;
identifying one or more border regions in the captured image that correspond to the border of the area of interest;
analyzing the one or more border regions of the captured image and determining if an object has entered the one or more border regions of the area of interest; and
outputting a signal indicating when an object has entered the one or more border regions of the area of interest.

Nichani et al. teach capturing an image of an area of interest containing a background texture and detecting changes in the background texture as an indication of the presence of an intruding object. See column 5, lines 45-65. Nichani et al. do not appear to teach or suggest identifying a border region in the captured image or the area of interest and thus do not teach or suggest analyzing a border region to determine if an object has entered the border region. Ito et al. similarly teaches comparing the background in a saved image of the area of interest to the background in a current image to detect changes in the background indicative of the presence of an object. Neither reference teaches or suggests identifying a border region in the captured image corresponding to a border of the area of interest and thus do not teach determining if an object has entered the border region. For at least the reasons set forth above, dependent claims 12-23 are similarly distinguished from Nichani et al. and Ito et al.

Claim 24 and the claims dependent thereon recite the method steps of capturing at least two images of the area of interest using two separate image capturing devices, identifying one or more border regions in the captured images that correspond to the border of the area of interest, analyzing the one or more border regions of the captured images to determine when an object enters the area of interest, and outputting a signal indicating whether or not an object has entered the area of interest. Nichani et al. do not appear to teach such a method. Nichani et al. specifically teach an advantage of their system and method is that "a single camera-lighting fixture could be used such that the whole area is uniformly lit and viewed", making the detection uniform across the target area. See column 6, lines 39-42. Additionally, as stated above, Nichani et al. do not appear to teach or suggest anything regarding identifying a border region in the captured

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images or analyzing the border regions to determine when an object enters the area of interest.

Independent claim 27 recites a system for monitoring an area of interest having a border and an interior region, comprising capturing means for capturing a capture image of the area of interest, and monitoring means for monitoring at least a portion of the border region of the area of interest for breach by an object, and for monitoring at least a portion of the interior region of the area of interest for the presence of the object after the object breaches the border. Nichani et al. does not appear to have monitoring means for monitoring a border region, and then an interior region after the border region has been breached, as is recited in the claim. As discussed above, Nichani et al. teach monitoring means for monitoring the entire area of interest, and do not teach or suggest identifying or monitoring a border region.

Independent claim 28 and claims 29-30 dependent thereon recite a system having an image capturing means, first and second processing means for processing at least one capture image to determine if an object has entered the area of interest, and output means for outputting a signal indicating that an object has entered the area of interest when both the first processing means and second processing indicate that an object has entered the object of interest. Nichani et al. appear to have one processing means for processing the capture image of the entire area of interest in order to determine if an object has entered the area. Nichani et al. do not teach or suggest using two processing means or outputting a signal indicating the presence of an object when both processing means indicate the presence of an object.

Claim 31 recites a method in which at least a portion of the border region of the area of interest is monitored for breach by an object having a first minimum size, and at least a portion of the interior region of the area of interest is monitored for an object having a second minimum size after the object breaches the border region of the area of interest. Dependent claim 32 recites the method of claim 31 in which the first minimum size is smaller than the second minimum size. The Examiner did not specifically address claim 31, but with respect to claim 32, the Examiner asserts that Nichani et al.'s process of comparing two images reads on the limitation of the first minimum size being smaller

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than the second minimum size. The Examiner points to column 4, lines 19-25 for support. This passage of Nichani et al. merely teaches

These areas are further processed to discriminate shadows from objects by comparing the changed features of the observed surface against the previously observed features of the vacant background in the safety zone. Further processing results in rapid identification of alarm conditions in accordance with prescribed criteria.

Applicants do not understand how this passage of Nichani et al. is relevant to claims 31 or 32. The above passage of Nichani et al. is directed to the comparison of a background image to a current image and provides no teaching or suggestion of monitoring a border region for an object having a first minimum size and monitoring an interior region for an object having a second minimum size, as is recited in the claims. Dependent claim 33 is similarly distinguished from Nichani et al.

With regard to dependent claims 34 and 35, the Examiner asserts that Nichani et al. discloses the interior region being defined to include the border region, citing column 4, lines 39-32 (assumed to be 29-32), and also discloses the interior region is defined to exclude the border region, citing column 4, lines 33-37. Applicants submit that these passages of Nichani et al. do not teach or suggest the elements of claims 34 or 35. Lines 29-32 of column 4 recite "[a]n object, multiple objects, or an area being monitored are collectively called the 'target' for purpose of discussion. The target is being protected from encroachment by another foreign object, called the 'intruder.'" Applicants submit that this passage in Nichani et al. merely describes what is meant by the term "target" and it includes one or more objects or areas. This passage does not, however, teach or suggest a method in which the area of interest has a border region and an interior region. The second passage cited by the Examiner, lines 33-37 of column 4, merely teaches the apparatus as including an image acquisition device arranged to view light reflected from a target scene, such as a safety zone near a dangerous machine. Again, there is no teaching or suggestion of an area of interest having both a border region and an interior region, as is recited in the claims.

Independent claim 36, and claims 37-41 dependent thereon recite a method for monitoring an area of interest having two or more regions, in which each region has a

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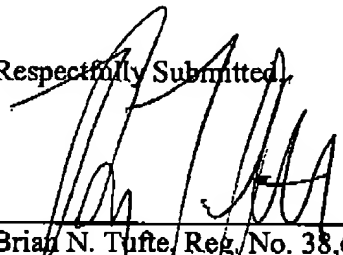
border and an interior region. The method involves capturing a capture image of the area of interest, monitoring the border and/or interior region of a first region of the area of interest for breach by an object, and monitoring the border and/or interior region of a second region of the area of interest for breach by an object. The Examiner did not separately address claims 36-41. As discussed above, Nichani et al. teach a method and system for monitoring an area of interest by comparing the entire area with a background image containing a background texture. Nichani et al. do not teach or suggest monitoring an area of interest having two or more regions in which each region has a border region and an interior region, as is recited in the instant claims. Nor do Nichani et al. appear to teach or suggest monitoring each of two or more regions.

Nichani et al. do not appear to teach or suggest the elements of the claims. Ito et al. do not provide what Nichani et al. lack, therefore a combination of Nichani et al. and Ito et al. also fails to teach or suggest the elements of the claims. Withdrawal of the rejection is respectfully requested.

Reconsideration and reexamination are respectfully requested. It is submitted that, in light of the above remarks, all pending claims 1-41 are now in condition for allowance. If a telephone interview would be of assistance, please contact the undersigned attorney at 612-359-9348.

Respectfully Submitted,

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